

Lesson one: Functions Are a Rule

$Y=mx+b$: This is the equation of a line.

M= slope

B= y-intercept

A function is rule that assigns one output for every input.

Consider these rules to determine if it is a function:

There is “food” rule F that assigns fruit to a food that can be made from it.

This is NOT a function because apples could make apple pie or applesauce.

$F(\text{apple}) = \text{apple pie}$ or $F(\text{apple}) = \text{applesauce}$

However, a “Juice” rule J is a function because there is only a specific juice that can be made from each fruit.

$J(\text{apple}) = \text{apple juice}$

There is an “ice cream” rule I that tells what kinds of ice cream people like.

This is NOT a function because people can like more than one flavor.

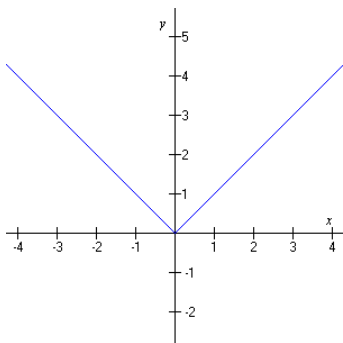
$I(\text{Ashley}) = \text{chocolate}$ or $I(\text{Ashley}) = \text{coffee}$

However, if asked for your “favorite ice cream flavor” rule this is a function because there can only be one response.

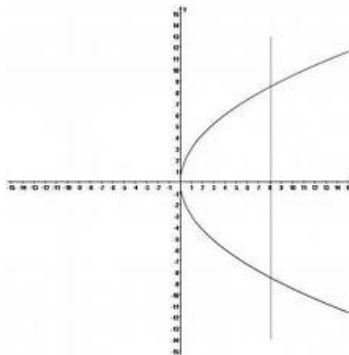
Year	Population in Maine
2011	1,328,188
2010	1,328,361
2004	1,317,253
2000	1,274,923

This is a function because for every input (year) only one output is generated (population)

For graphs, use the vertical line test to say if the graph is a function or not. Use a vertical piece of material (pencil or ruler) and slide it vertically across a graph. At any point there should only be one intersection. If at any given point there is more than one then it's not a function.



This passes the vertical line test.



This does not pass the vertical line test.

What's the Function rule?

X	0	1	2	3	4	5	6
Y	0	7	14	21	28	35	42

Each y value is 7 times its x value.

$$y=7x$$

A	0	1	2	3	4	5
B	5	8	11	14	17	20

$$Y=3x+5$$

This one is tougher to figure out. When $a=0$ $b=5$ so we know our y-intercept is +5. If we start at when $a=1$ then we will minus 5 from 8 and 3 is leftover. If we multiply 1 by 3 we get 3 and when we add 5 we get 8. It works for all values so we found the rule.

Given the x values and the "rule", find the y values

X	0	1	2	3
y				

$$Y=6x-3$$

$$Y=6(0)-3=-3$$

$$Y=6(1)-3=3$$

$$Y=6(2)-3=9$$

$$Y=6(3)-3=15$$